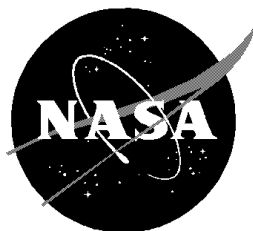


Orbiter Crew Compartment Interface Control Annex

Cell Culture Module-A

July 1996



National Aeronautics and
Space Administration

Lyndon B. Johnson Space Center
Houston, Texas

NSTS 21187
ICA

DESCRIPTION OF CHANGES TO

ORBITER CREW COMPARTMENT
INTERFACE CONTROL ANNEX

CELL CULTURE MODULE-A

CHANGE NO.	DESCRIPTION/AUTHORITY	DATE	PAGES AFFECTED
--	Basic issue/A21187-ICA-0001	01/03/96	All
REV A	General revision/A21187-ICA-0002	07/30/96	All
1	Update section 2/A21187-ICA-0003	10/24/96	2
2	Update section 2/A21187-ICA-0004	11/05/96	2

Note: Dates reflect latest signature date of CR's received by PILS.

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ORBITER CREW COMPARTMENT
INTERFACE CONTROL ANNEX

CELL CULTURE MODULE-A

JULY 30, 1996

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dated 11/27/95

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CREW COMPARTMENT
CREW STATION MANAGER

Signed by Emmett Shepard,
dated 12/14/95

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dated 01/03/96

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PREFACE

This document is issued as an interface control annex to the Payload Integration Plan (PIP) for the Cell Culture Module-A (CCM-A) payload. This interface control annex describes all CCM-A equipment stowed or installed in the Orbiter crew compartment and the pertinent requirements affecting interfaces, stowage, installation, or flightcrew use.

In case of any variation between this interface control annex and the PIP, the PIP shall take precedence. Any requirements submitted in this document that are not within the scope of the PIP will not be considered binding on the National Aeronautics and Space Administration (NASA) for implementation.

By signing this document, the customer is accepting and agreeing to abide by the requirements defined in the following documents unless otherwise specified and/or agreed to in this document.

NSTS-21000-IDD-MDK	Shuttle/Payload Definition Document for Middeck Accommodations
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NSTS-21000-ICA	Orbiter Crew Compartment Interface Control Annex Blank Book
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The location of equipment defined in this interface control annex is subject to change by NASA without prior agreement as long as the basic requirements of the payload and integrating hardware are satisfied. Official stowage/installation locations for a given flight will be defined in the appropriate Crew Compartment Configuration Drawing (CCCD).

Any stowage time requirements listed in this interface control annex are used to assure installation/removal feasibility. Final stowage timelines are the responsibility of the NASA John F. Kennedy Space Center (KSC).

Corrections and updates to this interface control annex will be made as necessary.

Comments or questions relative to this interface control annex should be directed to the following:

Space Shuttle Program Representative:

NASA Lyndon B. Johnson Space Center (JSC)
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Customer Technical Representative:

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1. MIDDECK IDD REQUIREMENTS

The payload will meet all requirements as defined in the Shuttle/Payload Interface Definition Document for Middeck Accommodations, NSTS-21000-IDD-MDK. The customer will be responsible for the following sections of the NSTS-21000-IDD-MDK:

1.0		2.0		3.0		4.0		5.0
1.1		2.1		3.1		4.7		5.1
1.1.1		2.1.1		3.1.1		4.7.2		5.2
1.2		2.1.2		3.2		4.7.3		5.3
		2.2		3.3		4.8		
		2.3		3.3.1		4.8.1		
		2.4		3.4				
				3.4.1				
				3.4.1.1				
				3.4.1.2				
				3.6				
				3.7				
				3.8				

6.0		7.0		8.0		9.0		10.0
6.1		7.1		8.1		9.1		10.1
6.1.1		7.1.1		8.2		9.1.1		10.2
6.2		7.2		8.2.1		9.1.2		10.2.2
6.2.1		7.2.1		8.2.2		9.2		10.3
6.2.1.1		7.2.1.1		8.3				10.3.1
6.2.1.2		7.2.1.3		8.3.1				10.3.1.1
6.2.1.3		7.2.1.4		8.3.2				10.3.2
6.2.2		7.2.2		8.4				
		7.4		8.4.1				
		7.4.1		8.4.1.1				
		7.4.2		8.4.1.2				
		7.4.3		8.4.1.2.1				
		7.5		8.4.1.2.1.1				
		7.5.1		8.4.1.2.1.2				
				8.4.1.2.1.3				
				8.4.1.2.3				
				8.4.1.2.3.1				
				8.4.2				
				8.5				
				8.5.1				
				8.5.3				
				8.5.4				

2. PAYLOAD UNIQUE EXCEEDANCES, WAIVERS, DEVIATIONS TO MIDDECK IDD

The payload will meet all requirements as defined in Section 1 above for the Shuttle/Payload Interface Definition Document for Middeck Accommodations, NSTS-21000-IDD-MDK. To support payload review and acceptance, the customer may be required to submit test data for Electromagnetic Compatibility (EMC), Thermal, Acoustic, and Structures. If test data is required, the data will be available to Lyndon B. Johnson Space Center (JSC) for review no later than Launch minus 4 (L-4) months.

For payload hardware requiring stowage into a locker, the payload is willing to accept the loads transmitted to the hardware by the Orbiter through isolating foam material inside the stowage locker. (Reference NSTS-21000-IDD-MDK, Section 4).

The following are approved exceedances to the Middeck Interface Definition Document (IDD).

- a. Payload exceedance on Section 3.4.1-Payload Weight Exceedance-Standard Modular Stowage Locker, has been approved per CR A-21187-ICA-0001.
 - b. Payload exceedance on Section 5.3-Discharge Exceedance-Payload Effluents, has been approved per CR A-21187-ICA-0001.
 - c. Payload exceedance on Section 4.7.3-Payload Generated Acoustic Noise Exceedance, has been approved per CR A-21187-ICA-0001.
 - d. Payload exceedance on Section 8.3.1-Payload Produced Conducted Noise Exceedance, has been approved per CR A-21187-ICA-0003.
 - e. Payload exceedance on Section 8.4.1-Electrical Bonding, has been approved per CR A-21187-ICA-0004.
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3. POWER REQUIREMENTS

Payload power interface characteristics at the Space Shuttle Program (SSP)/payload interface are per Section 7 of the Shuttle/Payload Interface Definition Document for Middeck Accommodations, NSTS-21000-IDD-MDK.

Table 3-1.- PAYLOAD POWER INTERFACE REQUIREMENTS

Orbiter service by flight	IDD ref. para.	Voltage range	Power watts		Time limit on peak power	Payload character- istics
			Max. cont.	Peak		
Prelaunch	7.2.1	22 V - 32 V dc	28 W	70 W	50 msec	Resistive
Ascent	7.2.1	22 V - 32 V dc	28 W	70 W	50 msec	Resistive
On-orbit operation	7.2.1	22 V - 32 V dc	28 W	70 W	50 msec	Resistive
Descent	7.2.1	22 V - 32 V dc	28 W	70 W	50 msec	Resistive
Postflight	7.2.1	22 V - 32 V dc	28 W	70 W	50 msec	Resistive

4. PAYLOAD INSTALLATION/STOWAGE/CREW INTERFACE REQUIREMENTS (CCM-A)

- a. The experiment objective is to evaluate microgravity stress on bone and other body cells and to test tissue loss pharmaceuticals for efficacy.
- b. Stowage requirements shall not exceed one middeck locker for the Cell Culture Module-A (CCM-A) and the experiment module shall not weigh more than 57.2 lb. The CCM-A payload requires stowage for a spare CCM-A fuse contained in a zip-lock bag and an RS-232C 9-to-9 pin data interface. Two CCM-A data diskettes (a primary and a backup) containing backup CCM-A files will be stored in the Flight Data File (FDF).
- c. The payload experiment module consists of a middeck standard locker compatible double tray replacement assembly which allows for 1/2 in. of isolating foam around the payload.
- d. CCM-A requires a locker with a modified locker door with all three panels removed.
- e. The payload configuration requires late stowage (within L-24 hr) for launch and early removal after landing due to sample life and gravity sensitivity. Late installation is to be completed by L-14 hr.

- f. The payload requires Orbiter-supplied 28 V dc power from a standard middeck outlet throughout all phases of the mission.
- g. Nominal experiment activities require no crew intervention beyond a single pushbutton input following arrival on-orbit and another single pushbutton input to signal preparation for landing.
- h. Off-nominal experiment activities require a crewmember to change out a fuse, recycle system power and use a shared flight Payload and General Support Computer (PGSC) for experiment commanding and data file uploads and downloads between the experiment and the PGSC.
- i. The CCM-A configuration requires a backup locker configured for flight to support payload turnaround due to launch scrubs.

5. STOWAGE/INSTALLATION HARDWARE DEFINITION (CCM-A)

NOMENCLATURE AND P/N	QTY	DIMENSIONS (in.)	WEIGHT (lb)
SSP-provided for dedicated use:			
Middeck stowage locker, with modified access door, with all three panels removed P/N SED39119019-321 (See section 9, item e.)	1	N/R	10.5 lb
DC power cable P/N 10108-10082-XX or V733-718701-XXX	1	See section 9 item a.	N/R
RS232 data cable SED33103348-307	1	2.0 x 7.5 x 8.25	2.5 lb
SSP-provided equipment for shared use:			
486 PGSC P/N SED33106017-303	1	N/A	N/A
PGSC power cable P/N SED33103334-311	1	N/A	N/A
Payload-provided: (reference figure 1)			
CCM-A experiment module P/N DOD40010D	1	19.3 in. x 16.3 in. x 8.9 in.	57.2 lb

5. STOWAGE/INSTALLATION HARDWARE DEFINITION (CCM-A) (Concluded)

NOMENCLATURE AND P/N	QTY	DIMENSIONS (in.)	WEIGHT (lb)
CCM-A spare fuse P/N BUSS MDA4	1	See note g.	0.2 oz
CCM-A Data Diskettes	2	Stowed in FDF.	0.7 oz ea

6. PAYLOAD ELEMENT STOWAGE/INSTALLATION DESCRIPTION (CCM-A)

- a. To support stowage design and analysis, the Payload Customer, at time of manifesting, will submit to the Crew Compartment Engineer, engineering drawings of all hardware defined in this annex as payload provided. Access to the hardware may be required to support the stowage design.
 - b. To support proper installation and stowage assessments, the customer will be required to supply center of gravity (c.g.) data for all hardware being installed in place of a locker or hardware being stowed exceeding 30 lb in weight.
 - c. The dc power cable length and routing for each mission will be defined in the Crew Compartment Configuration Drawing (CCCD).
 - d. Installation of the experiment module will be into a locker without a stowage tray and surrounded with a half-in. of foam on all six sides (reference figure 2). The module will be stowed in a locker with a modified locker door with all three panels removed.
 - e. Exact stowage configuration of the CCM-A equipment will be defined by the CCCD.
 - f. A backup flight-configured locker will be provided to support payload turnaround in the event of a launch scrub.
 - g. The spare fuse will be contained in a zip-lock bag prior to stowage into a locker.
-

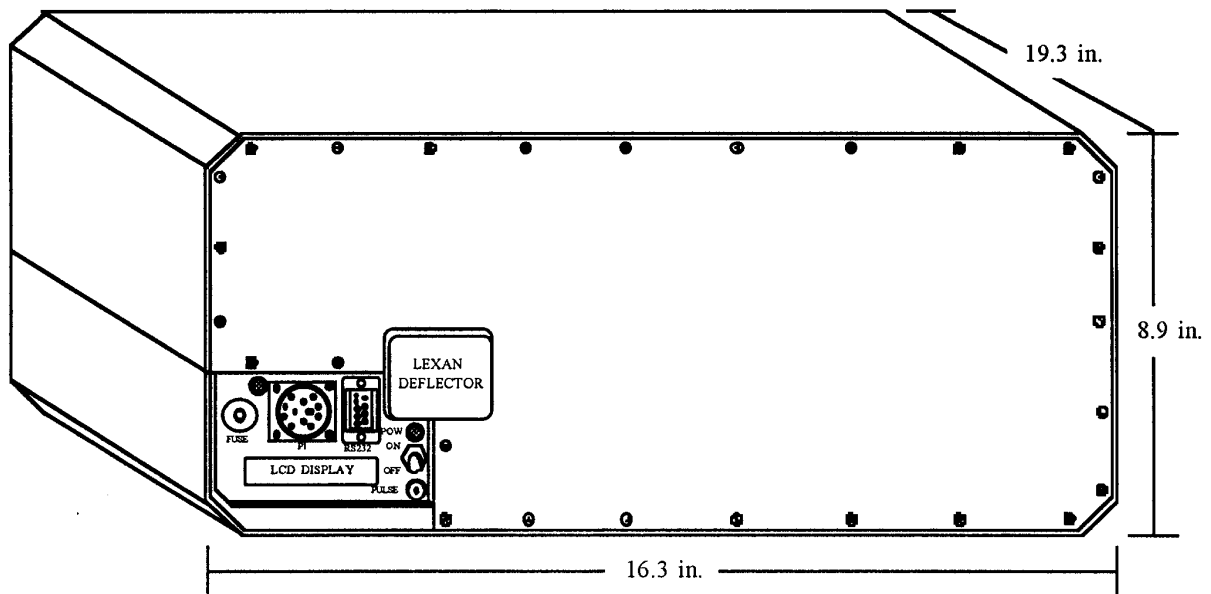


Figure 1.- CCM-A configuration.

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